Claims

1. A high frequency semiconductor device having a shifted doping profile, comprising:

a buried oxide layer formed over a semiconductor substrate; and

a silicon layer formed over the buried oxide layer, wherein an origin of a doping profile of the silicon layer is within a body region of the device.

2. The device of claim 1, wherein the silicon layer comprises a source region, a body region, a drain region, and a drift region,

3. The device of claim 1, further comprising a top oxide layer, wherein the origin of the doping profile is offset approximately 2 to 4μm from an edge of the top oxide layer.

4. The device of claim 1, further comprising a field plate formed over the top oxide layer and a plate oxide layer formed over the field plate.

5. The device of claim 4, further comprising a source metal, a gate metal, and a drain metal formed over the silicon layer.

6. The device of claim 1, wherein the doping profile is linear.

7. The device of claim 1, wherein the doping profile is non-linear.

8. A high frequency semiconductor device having a shifted doping profile, comprising:

a buried oxide layer formed over a semiconductor substrate;

a silicon layer formed over the buried oxide layer, wherein the silicon layer comprises a source region, a body region, a drift region, and a drain region; and

a top oxide layer formed over the silicon layer, wherein a doping profile of the silicon layer has an origin within the body region, approximately 2 to 4μm from an edge of the top oxide layer.

9. The device of claim 8, wherein the doping profile is linear.

10. The device of claim 8, wherein the doping profile is non-linear.

11. The device of claim 8, further comprising a field plate formed over the top oxide layer and a plate oxide layer formed over the field plate.

12. The device of claim 11, further comprising a source metal, a gate metal, a drain metal formed over the silicon layer.

13. The device of claim 8, wherein the device has a transconductance approximately 15% higher and a maximum current approximately 45 % higher than a device having a doping profile origin approximately aligned with the edge of the top oxide layer.

14. A method for forming a high frequency semiconductor device having a shifted doping profile, comprising:

forming a buried oxide layer over a semiconductor substrate;

forming a silicon layer over the buried oxide layer;

forming a doping profile in the silicon layer having an origin within a body region of the device; and

forming a top oxide layer over the silicon layer.

15. The method of claim 14, wherein forming a doping profile in the silicon layer having an origin within a source region of the device comprises:

positioning a mask over the silicon layer; and

implanting ions through openings in the mask so that the origin of the doping profile is offset from an edge of the top oxide layer by a predetermined distance.

16. The method of claim 15, wherein the predetermined distance is approximately 2 to 4μm.

17. The method of claim 14, wherein forming a silicon layer over the buried oxide layer comprises forming a silicon layer having a source region, a body region, a drift region, and a drain region over the buried oxide layer.

18. The method of claim 14, wherein the doping profile is linear.

19. The method of claim 14, wherein the doping profile is non-linear.

20. The method of claim 14, further comprising:

forming a field plate over the top oxide layer;

forming a plate oxide over the field plate; and

forming a source metal, a gate metal, and a drain metal over the silicon layer.